Unit 8
Day 4
The Discriminant

5.6 The Discriminant

Def: Discriminant- is a numerical value used to determine the number and type of solutions a quadratic equation will have. Number under radical

Given a quadratic equation in $ax^2+bx+c=0$ form, then b^2-4ac is the formula used to determine the discriminant.

When determining the discriminant:

If $b^2-4ac > 0$ & a perfect square, then the quadratic equation has 2 real, rational solutions.

If $b^2-4ac > 0$ & a non-perfect square, then the quadratic equation has 2 real, irratonal solutions.

If $b^2-4ac < 0$, then the quadratic equation has 2 non-real (complex) solutions.

If $b^2-4ac = 0$, then the quadratic equation has 1 real, rational solution.

Find the discriminant and indicate the number and type of solutions it contains.

a) b)

Ex1: $7a + 2 = 3a^2 - 6$

$0 = 3a^2 - 7a - 8$

$b^2 - 4ac$

$(-7)^2 - 4(3)(-8)$

$49 + 96$

145

a) 2 b) irrat.

Find the value of k such that the quadratic has only one solution.

Ex2: $3x^2 + kx + 6 = 0$

$a = 3 \quad b = k \quad c = 6$

2 real
+ disc

$b^2 - 4ac > 0$

$b^2 - 4ac = 0$

$k^2 - 4(3)(6) = 0$

$k^2 - 72 = 0$

$k^2 = 72$

$k = \pm 6\sqrt{2}$

Find an equation with the given solutions:

Ex3: $x=\{-5, \frac{1}{2}\}$

$$(x+5)(2x-1)=0$$

$2x-1=0$

$2x=1$

$x=\frac{1}{2}$

$x=\frac{1}{2}$

$2x=1$

$2x-1=0$

$$2x^2+9x-5=0$$

Solving Cubes:

Ex4: $x^3 - 8 = 0$

Solving quadratic literal equations:

skip 2010

Ex5: $V=\pi r^2 h$ solve for r

Ex6: $A = 2\pi r^2 + 2\pi rh$, Solve for r

skip 2010

HW pg 118 35,36,38, 66-72 (even), 77-80 all

Extra problems:

Find the value of k such that the quadratic has only one solution.

1) $25m^2-10m+k=0$

2) $y^2+11y+k=0$

3) $kr^2+(2k+6)r+16=0$

4) $ky^2+2(k+4)y+25=0$

Ex1 : $2x^2 + 4x - 7 = 0$

Ex2: $\frac{1}{3}m^2 + \frac{1}{5}m + \frac{1}{15} = 0$

Ex3: $a^2 + a\sqrt{3} + 5 = -2$

HW pg 118-119 23-34, 39-44 all